APPENDIX F

Physiological Maturity Determination Guidelines

Physiological Maturity Evaluation

For steer and heifer beef, maturity of the carcass is determined by evaluating the size, shape, and ossification of the bones and cartilages -- especially the split chine bones -- and the color and texture of the lean flesh. In the split chine bones, ossification changes occur at an earlier stage of maturity in the posterior portion of the vertebral column (sacral vertebrae) and *at progressively later stages of maturity in the lumbar and thoracic vertebrae*. The ossification changes that occur in the cartilages on the ends of the split thoracic vertebrae are especially useful in evaluating maturity of B^{00} and older carcasses and these vertebrae are referred to frequently in the grading standards. Unless otherwise specified in the standards, whenever reference is made to the ossification of cartilages on the thoracic vertebrae, it is construed to refer to the cartilages attached to the thoracic vertebrae at the posterior end of the forequarter. The size and shape of the rib bones also are important considerations in evaluating differences in maturity. The color and texture of the lean also undergo progressive changes with advancing maturity. In the very youngest of carcasses, the lean flesh will be very fine in texture and light grayish red in color. In progressively more mature carcasses, the texture of the lean becomes more coarse and the color of the lean will become darker red.

Carcasses qualifying for any particular maturity may vary with respect to their relative development of the various factors. There will be carcasses that qualify for a particular maturity, some of whose characteristics may be more nearly typical of another maturity. For example, in comparison with the descriptions of maturity contained in the standards, a particular carcass might have a greater relative degree of ossification of the cartilages on the ends of the lumbar vertebrae in comparison to other evidences of maturity. In such instances, the skeletal maturity of the carcass is not determined solely by the ossification of the lumbar vertebrae, but neither is this ignored. Thus, all of the maturity-indicating factors are considered. In making any composite evaluation of two or more factors, it must be remembered that they seldom are developed to the same degree.

In the very youngest carcasses considered as beef (A^0 maturity), the cartilages on the ends of the chine bones show no ossification, cartilage is evident on all of the vertebrae of the spinal column, and the sacral vertebrae show distinct separation. In addition, the split vertebrae usually are soft and porous and very red in color. In such carcasses, the rib bones have only a slight tendency toward flatness. In progressively more mature carcasses, ossification changes become evident first in the bones and cartilages of the sacral vertebrae, then in the lumbar vertebrae, and still later in the thoracic vertebrae. The following table provides a reference description of critical characteristics in the evaluation process throughout the A maturity group:

Description of Maturity Characteristics within A Maturity

	A^{00}	A^{40}	A^{50}	A^{100}
Sacral Vertebrae	Show distinct separation	Show distinct separation, caps show considerable evidence of cartilage	Show separation, caps show evidence of cartilage	Completely fused
Lumbar Vertebrae	No ossification	Caps tend to be partially ossified	Caps tend to be nearly moderately ossified	Nearly completely ossified
Lean Color	Light grayish red	Light red	Tends to be moderately light red	Moderately light red

Footnote: This information is extrapolated from the United States Standards for Grades of Carcass Beef and is intended to describe the characteristics with the greatest degree of influence for determining physiological maturity at the specified end points. Other characteristics described in the standards are less pronounced at these particular reference points and provide less influence.